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ASEROE RUBRA, AN INTERESTING NEW ZEALAND PHALLOID.

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ASEROE RUBRA, AN INTERESTING NEW ZEALAND PHALLOID.

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This fungus is common throughout New Zealand, and may at certain seasons of the year be obtained growing amongst decaying leaves on the forest-floor. It is readily noticeable owing to its bright-red colour, superficial resemblance to a sea-anemone, and penetrating odour. When in the forest one frequently becomes aware of its presence, owing to its powerful odour, before the plant itself is observed. As will be shown below, the bright colour and penetrating odour are factors that play an important part in spore-dissemination.

Aseroe La Billardière.

Relation du Voyage a la Recherche de La Perouse, 1791 and 1792. Paris arr. viii de la rep., p. 145, 1799–1800.

Volva at first globose, becoming cupulate, composed of three layers, exo-, meso-, and endo-peridium; attached to the substratum by numerous white rhizoids. *Stipe* at base enclosed in the volva, becoming broadly expanded at apex. *Receptacle* borne at apex of stipe, expanded into a horizontal disc, the margin of which is divided into a variable number of rays. *Gleba* gelatinous, coloured, fetid, imposed on upper surface of disc and proximal part of rays. *Spores* continuous, coloured.

Distribution.—The genus occurs in Australia, Japan, China, Ceylon, Java, Brazil, and is in New Zealand represented by the following single species.

Aseroe rubra La Billardière, *l.c.*, p. 145.

Aseroe pentactina Endlich., *Icon. Gen. Plant.*, pl. i, 1838. *A. viridis* Berk. et Hook. f. in *Hook. Jour. Bot.*, vol. 3, p. 192, 1844. *A. actinobola* Cda., *Icon. Fung.*, vol. 6, p. 23, 1854. *A. Hookeri* Berk., *Fl. N.Z.*, vol. 2, p. 187, 1855. *A. corrugata* Col., *Trans. N.Z. Inst.*, vol. 16, p. 362, 1883. *A. Muelleriana* Ed. Fisch. in *Sacc. Syll.*, vol. 7, p. 26, 1888.

Volva at first obovate, becoming at maturity cupulate, up to 3 cm. diam., consisting of three layers, a dingy-white exoperidium, a gelatinous thick mesoperidium, and a delicate hyaline endoperidium; attached to substratum by a few coarse white basal rhizoids. *Stipe* cylindrical, at base enclosed in volva, white, shading to pink towards apex, up to 6 cm. high and 2 cm. wide, variable in size, obconic, hollow, pervious at the apex, cellular, somewhat rugulose, subtranslucent, expanding at the apex into a broad circular disc-like receptacle up to 3 cm. wide, to which are attached the rays. *Rays* 5–8, red, conniving, up to 3·5 cm. long, 6 mm. wide, at the base longitudinally grooved, rugose on both surfaces but more deeply on the upper, bifurcate at about 15 mm. from base, subulate towards tips, which are twisted or curled. *Gleba* covering disc and upper surface of base of rays, fetid, gelatinous, olivaceous, almost black when dry. *Spores* olivaceous, elliptical, rounded at both ends, $6 \times 4\ \mu$.

Habitat.—Growing solitary or more rarely crowded amongst decaying leaves on forest-floor.

Distribution.—Australia; Tasmania; widely distributed throughout the lowland forests of New Zealand.

This is an extremely variable species, differing considerably in size, number of rays, and colour. In the past this has led to its having been named several times. In the herbarium I have a large number of specimens, and find that such features as the number of rays, size, and colour are by no means constant. For example, forms with six, seven, or eight rays are quite common, and specimens varying in height from 3 cm. to 6 cm. or more

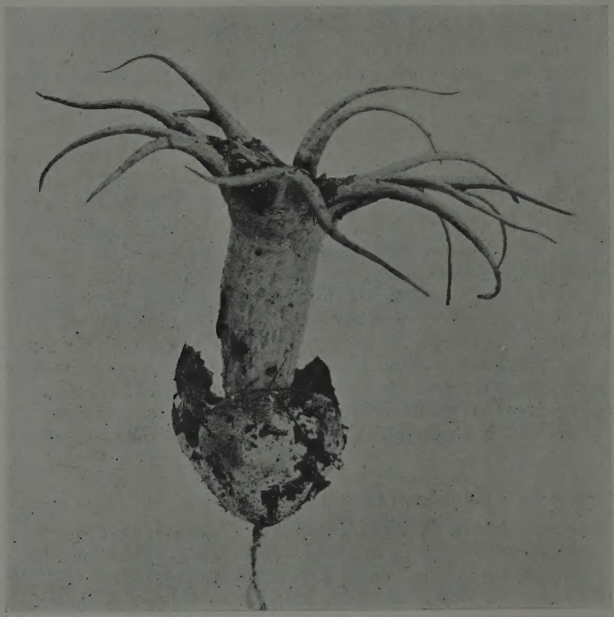

FIG. 1.—*Aseroe rubra* Lab.: mature plant; eight-rayed form.

may frequently be obtained. Furthermore, colour is by no means a constant character, as specimens may be found in which the colour shades from a bright red to a pallid pink. At Weraroa in May, 1919, I obtained a perfectly white form, the only colour present being that of the gleba.

A. corrugata is not uncommon in New Zealand, and differs but slightly from the typical form. *A. viridis* was separated from *A. rubra* on account of its colour, which was stated to be a metallic green. Later, Berkeley in 1855 included it under *A. Hookeri* (which he separated on account of its small size), because he subsequently obtained specimens resembling this species in form and colour.

Colenso (1883) states that this species was by the Woodville settlers considered fatal to their cats. "They say that their cats eat it, being fond of it, and die soon after." [!]

Buller (1892) quite erroneously claimed that this is an insectivorous plant. In his own words: "I have met with these plants in various parts of New Zealand, always in the depth of the woods, its star-like form and bright colour attracting immediate notice. But what I desire to call attention to now is the singular fact (hitherto unrecorded) that this fungus appears to be insectivorous in its habit of life. . . . Had the surface cup [receptacle], if I may so term it, completely filled with the partially dissolved bodies of dead insects. . . . From the interior of the stem a viscid foul-smelling fluid is secreted, and this rises into the cup and mixes with the bodies of moths, flies, beetles, and other small insects collected there, which appear to undergo a process of gradual dissolution

FIG. 2.—Mature plant; small seven-rayed form. Photographed immediately after it had attained full size.

FIG. 3.—Egg, photographed immediately after it had become ruptured at the apex. Note the arms of the receptacle beginning to show through the volva.

FIG. 4.—Section of an egg shortly before rupture of the volva. Note the cellular mass of the gleba enclosed within the arms of the receptacle, which in turn are enclosed within the gelatinous volva.

All photographs by the writer. All natural size.

and absorption. Now, the question arises, Is this fungus, like *Drosera*, a carnivorous plant, and is it endowed with its pungent odour, added to its flower-like brilliancy, for the purpose of attracting its insect food? And is the fluid a solvent with the acid constituent for aiding the process of digestion? My answer is in the affirmative.

"I dissected one of the stems, and found it was hollow, or nearly so, with what appeared to be a membranous sac at the bottom containing

fluid matter; but the examination, made on the spot, was necessarily a very hasty and imperfect one."

I quite agree with the concluding sentence. As for the rest, it will be seen below that the plant is not insectivorous, and what Buller considered to be the "partially dissolved bodies of dead insects" is in reality the dark-coloured mass of the gleba. He was correct in assuming that the pungent odour and flower-like brilliancy attracted insects, but not for the purpose he imagined.

The mucilaginous gleba covers the upper surface of the disc and portions of the rays. It is dark in colour, and possesses a most fetid odour, resembling somewhat that of decaying fish. In the gleba are embedded the minute spores. The colour of the plant and its conspicuous nature, together with its strong and penetrating odour, serve as a means of attracting insects, particularly blow-flies, which feed on the gleba; the spores, together with the mucilage, are assimilated by the insect, and the former, passing unharmed through the alimentary tract, may, if conditions are favourable, germinate where they happen to be voided.

The development of this species is similar to that of *Clathrus*,* differing in one or two details, especially in the development of the stipe.

Until recently this plant was supposed to be a saprophyte, but Mr. W. M. Carne† has recorded its parasitizing living roots of the grass *Cynodon dactylon* Pers. Another peculiarity he records is that in two specimens seen by him two or three stems emerged from a single volva.

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